Relation of
WHEAT ACREAGE AND PRODUCTION
To Wheat, Corn, Oat, and Soybean Prices
In Illinois

By C. P. Schumaier

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THE AGRICULTURAL RESOURCES of Illinois can be devoted to a variety of uses because of the state's rich soil, long growing season, and abundant, reliable rainfall. Illinois farmers may vary their crop-production patterns considerably among wheat, other small grains, corn and sorghum, and oilseed crops in response to economic incentives. Farmers in Illinois may operate on the economic principle of comparative *advantage*. Few groups of farmers are so fortunate. Farmers on the cold and dry margins must grow crops with the *least disadvantage* compared with richer agricultural regions.

Although Illinois farmers as a whole are fortunately endowed, the most productive land and the most favorable climatic conditions are in central and east-central Illinois. Southern Illinois land is much less fertile, yields are more variable, and alternatives more restricted than in central Illinois. Also, the state is some 400 miles long from north to south. Spring oats, for example, do well only from the central part of the state north, and winter oats are a dependable crop only in the extreme southern part of the state.

Because of the nature of agricultural resources in Illinois, experience in the state should provide a good test of two hypotheses with respect to wheat production: (1) wheat acreage and production decline in Illinois when prices are unfavorable and increase when prices are favorable compared with prices of competing crops, and (2) wheat-production adjustments related to price are greater in central Illinois, where there are more good alternatives, than in southern Illinois, where alternatives are more restricted.

Scope of the Study and Method of Analysis

This report analyzes production and acreage of wheat in Illinois in relation to the price-per-bushel and revenue-per-acre ratios between wheat and corn, oats, and soybeans during the years 1927-1958. As used in this study, the term "wheat" refers to winter wheat. A small amount of spring wheat was produced in the early years but the amount is now so negligible that spring wheat is no longer reported separately.

Consideration of revenue-per-acre ratios is particularly important

for this study because of the changes in yields due to technological advances during the period studied. For example, if during a given period of time corn had the same price-per-bushel ratios but increasing average yields relative to competing wheat, oats, and soybeans, then corn would earn more revenue per acre than the other crops and become relatively more profitable.

Data for this study were taken from reports of the Illinois Co-operative Crop Reporting Service for the years 1927 through 1958 and from annual issues of *Agricultural Statistics,* published by the U.S. Department of Agriculture, 1929 through 1958. Percentages and averages were the only measures used to test the hypotheses.

Three periods were selected for comparison: 1929-1938, 1942-1947, and 1952-1957. They represent, respectively, the prewar average, the situation during and immediately following World War II, and the postwar average. The periods are referred to in the text as prewar, war, and postwar, to make the reading easier.

Illinois Wheat Production and Acreage

Production. During the prewar period (1929-1938) Illinois produced an average of 36 million bushels of wheat annually (Table 1). The record year during this period was 1931 with 48.9 million bushels.

Production began to fall in 1938 and was down to 12.8 million bushels in 1942. Production during the war period (1942-1947) averaged only 21 million bushels annually, 42 percent less than the prewar average.

In 1947 production began to increase rapidly and reached a record high of almost 61 million bushels in 1956. Average annual production during the postwar period (1952-1957) was almost 50 million bushels, more than double the production during the war period and 38 percent more than the average of the prewar period.

Illinois ranked ninth among states in total wheat production in the 1947-1956 decade. In the 1941-1950 decade, Illinois had ranked thirteenth.

Illinois' percentage share of total United States wheat production ranged from 3.4 to 6.9 and averaged 4.8 percent in the prewar period (Table 1). The decline in Illinois wheat production after 1937 was accompanied by a decline in the state's percentage share of total U.S. production; in 1942 Illinois' percentage share fell to less than one-third of the prewar average. Illinois produced between 1.3 and 2.3 percent and an average of 2.0 percent of U.S. wheat during the six-year war period.

Beginning in 1948 the uptrend in Illinois wheat production raised Illinois' percentage share of total production to a postwar high of 6.1 percent in 1956. For the six-year postwar period, Illinois produced 4.7 percent of the nation's wheat, a slightly smaller share than the 4.8 percent of the prewar period, although total Illinois production averaged 38 percent more than in the prewar period.

Table 1. — Illinois and United States Wheat Production and Illinois Production as a Percent of Total United States Production, 1927-1958

Year	Illinois	United States	Relation of Illinois production to U. S. production
	million bushels		*percent*
1927	31.0	875.1	3.5
1928	19.5	914.4	2.1
1929	30.8	824.2	3.7
1930	36.9	886.5	4.2
1931	48.9	941.5	5.2
1932	26.0	756.3	3.4
1933	30.7	552.2	5.6
1934	36.5	526.1	6.9
1935	30.1	628.2	4.8
1936	36.4	629.9	5.8
1937	44.9	873.9	5.1
1938	40.9	919.9	4.4
1939	39.8	741.2	5.4
1940	39.3	814.6	4.8
1941	34.3	942.0	3.6
1942	12.8	969.4	1.3
1943	17.0	843.8	2.0
1944	24.3	1,060.1	2.3
1945	24.8	1,107.6	2.2
1946	19.4	1,152.1	1.7
1947	28.3	1,358.9	2.1
1948	38.5	1,294.9	3.0
1949	44.0	1,098.4	4.0
1950	27.6	1,019.4	2.5
1951	33.4	988.2	3.4
1952	42.4	1,306.4	3.2
1953	59.4	1,173.1	5.1
1954	47.8	983.9	4.9
1955	52.0	934.7	5.6
1956	60.9	1,004.3	6.1
1957	36.5	950.7	3.8
1958	54.2	1,462.2	3.7
Average			
1929–1938 (prewar)	36.2	753.9	4.8
1942–1947 (war)	21.1	1,082.0	2.0
1952–1957 (postwar)	49.8	1,058.9	4.7

Table 2. — Acreages of Four Principal Illinois Crops, 1927-1958

Year	Corn		Wheat		Oats		Soybeans		Total acres
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	
1927	8,469,000	57	2,293,000	15	4,008,000	27	184,000	1	14,954,000
1928	9,231,000	61	1,261,000	8	4,489,000	30	186,000	1	15,167,000
1929	8,575,000	58	1,978,000	13	4,064,000	27	226,000	2	14,843,000
1930	9,175,000	58	1,899,000	12	4,308,000	27	410,000	3	15,792,000
1931	9,817,000	59	1,994,000	12	4,308,000	26	428,000	3	16,547,000
1932	9,817,000	61	1,555,000	10	4,394,000	27	388,000	2	16,154,000
1933	8,835,000	59	1,804,000	12	3,999,000	27	361,000	2	14,999,000
1934	7,805,000	58	2,048,000	15	2,991,000	22	724,000	5	13,568,000
1935	8,195,000	53	2,048,000	13	3,828,000	24	1,509,000	10	15,580,000
1936	9,178,000	57	2,048,000	13	3,560,000	22	1,278,000	8	16,064,000
1937	9,270,000	55	2,540,000	15	3,702,000	22	1,355,000	8	16,867,000
1938	8,436,000	54	2,184,000	14	3,591,000	23	1,433,000	9	15,644,000
1939	7,869,000	53	1,922,000	13	3,153,000	21	1,892,000	13	14,836,000
1940	7,645,000	53	1,730,000	12	3,090,000	21	1,995,000	14	14,460,000
1941	7,721,000	51	1,704,000	11	3,569,000	23	2,338,000	15	15,332,000
1942	7,721,000	50	971,000	6	3,533,000	23	3,239,000	21	15,464,000
1943	8,384,000	52	1,020,000	6	3,427,000	21	3,436,000	21	16,267,000
1944	9,140,000	54	1,240,000	7	3,169,000	19	3,470,000	20	17,019,000
1945	8,130,000	49	1,332,000	8	3,372,000	20	3,760,000	23	16,594,000
1946	8,873,000	52	1,200,000	7	3,799,000	22	3,320,000	19	17,192,000
1947	8,584,000	51	1,339,000	8	3,311,000	20	3,636,000	21	16,870,000
1948	9,252,000	51	1,701,000	9	3,853,000	21	3,354,000	19	18,160,000
1949	9,252,000	51	1,905,000	10	3,834,000	21	3,287,000	18	18,278,000
1950	8,281,000	47	1,417,000	8	3,796,000	22	3,989,000	23	17,483,000
1951	8,736,000	50	1,757,000	10	3,359,000	19	3,731,000	21	17,583,000
1952	8,998,000	50	1,845,000	10	3,309,000	19	3,716,000	21	17,868,000
1953	9,358,000	51	2,122,000	11	3,110,000	17	3,846,000	21	18,436,000
1954	9,264,000	51	1,592,000	9	3,266,000	18	4,143,000	22	18,265,000
1955	9,171,000	50	1,576,000	9	3,168,000	17	4,328,000	24	18,243,000
1956	8,712,000	48	1,623,000	9	3,057,000	17	4,649,000	26	18,041,000
1957	8,276,000	47	1,769,000	10	2,751,000	15	4,974,000	28	17,770,000
1958	8,607,000	47	1,751,000	10	2,613,000	14	5,185,000	29	18,156,000
Average									
1929–1938 (prewar)	8,910,300	57	2,009,800	13	3,874,500	25	811,200	5	15,605,800
1942–1947 (war)	8,472,000	51	1,183,667	7	3,435,167	21	3,476,833	21	16,567,667
1952–1957 (postwar)	8,963,167	49	1,754,500	10	3,110,167	17	4,276,000	24	18,103,834

Acreage. The total annual acreage in the four principal Illinois grain crops increased from about 15 million to 18 million acres from 1927 to 1958 (Table 2). Wheat acreage declined from about 2 million acres in the prewar period to about 1.2 million during the war period and then increased again to 1.8 million in the postwar period. The acreage in soybeans increased from less than 200,000 in 1927 to over 5 million in 1958, while oat acreage declined from 4 million to less than 3 million. Corn acreage showed no consistent trend, ranging from a low of 7.6 million to a high of 9.8 million during the 32-year period.

Corn occupied 50 percent or more of the land in the four crops from 1927 to 1955 except for two years (Table 2). Since 1955 corn acreage has been just under half of the total acreage. The percentage of acres in oats declined steadily from 27 percent in 1927 to only 14 percent in 1958, while the percentage in soybeans increased steadily from 1 percent in 1927 to 29 percent in 1958. The percentage of acres in wheat averaged 13 percent in the prewar period, decreased to 7 percent during the war period, and rose during the postwar period to 10 percent.

Price and Revenue Ratios Between Wheat and Competing Crops

Price-per-bushel ratios. Over the 31-year period 1927-1957 the price of wheat in Illinois averaged 140.58 percent of the price of corn, 268.81 percent of the price of oats, and 85.84 percent of the price of soybeans (Tables 3 and 4). Expressed in another way, one bushel of wheat was worth 1.41 bushels of corn, 2.69 bushels of oats, and 0.86 bushel of soybeans.

One bushel of wheat was worth 1.46 bushels of corn in the prewar period, 1.29 bushels of corn in the war period, and 1.44 bushels of corn in the postwar period. In effect wheat prices relative to corn prices decreased 12 percent from prewar to war and increased 11 percent from war to postwar.

Relative to oat prices, wheat prices decreased 19 percent from prewar to war and increased 25 percent from war to postwar. One bushel of wheat was worth 2.78 bushels of oats prewar, 2.25 bushels war, and 2.98 bushels postwar.

In the postwar period price relationships between wheat and corn and oats were similar to those of the prewar period. Soybeans, how-

Table 3. — Average Annual Price per Bushel, Yield, and Revenue per Acre of Corn, Oats, Soybeans, and Wheat, Illinois, 1927-1957

Year	Corn			Oats			Soybeans			Wheat		
	Price per bu.	Bushels per acre	Revenue per acre	Price per bu.	Bushels per acre	Revenue per acre	Price per bu.	Bushels per acre	Revenue per acre	Price per bu.	Bushels per acre	Revenue per acre
1927	$ .85	32.0	$27.20	$ .46	25.5	$11.73	$1.60	13.0	$20.80	$1.30	13.5	$17.55
1928	.80	38.0	30.40	.38	37.5	14.25	1.57	16.5	25.91	1.19	15.5	18.45
1929	.76	35.5	26.98	.39	20.1	7.84	1.61	17.0	27.37	1.12	14.5	16.24
1930	.54	26.5	14.31	.30	18.8	5.64	1.18	17.0	20.06	.75	18.0	13.50
1931	.25	37.0	9.25	.17	34.0	5.78	.35	18.0	6.30	.40	23.5	9.40
1932	.27	43.0	11.61	.13	37.5	4.88	.47	20.0	9.40	.42	15.5	6.51
1933	.50	27.0	13.50	.32	20.0	6.40	.71	15.0	10.65	.85	16.5	14.03
1934	.79	21.5	16.99	.43	13.0	5.59	.86	19.0	16.34	.85	17.7	15.05
1935	.64	38.5	24.64	.25	28.5	7.13	.68	18.5	12.58	.84	14.5	12.18
1936	1.05	23.5	24.68	.40	28.5	11.40	1.18	16.0	18.88	1.02	17.5	17.85
1937	.47	48.0	22.56	.28	46.0	12.88	.80	20.0	16.00	1.03	17.5	18.03
1938	.45	44.0	19.80	.23	32.5	7.48	.64	23.5	15.04	.61	18.5	11.29
1939	.52	51.0	26.52	.30	30.8	9.24	.77	24.5	18.87	.70	20.5	14.35
1940	.61	43.0	26.23	.30	48.0	14.40	.85	17.5	14.88	.71	22.5	15.98
1941	.74	53.0	39.22	.41	43.0	17.63	1.54	21.5	33.11	1.01	20.0	20.20
1942	.90	54.0	48.60	.49	39.0	19.11	1.60	21.0	33.60	1.18	13.0	15.34
1943	1.06	50.0	53.00	.73	33.0	24.09	1.80	21.0	37.80	1.48	16.5	24.42
1944	1.05	45.4	47.67	.71	31.7	22.51	2.04	21.4	43.66	1.48	19.5	28.86
1945	1.21	46.5	56.27	.67	45.0	30.15	2.08	20.0	41.60	1.56	18.5	28.86
1946	1.51	56.0	84.56	.80	42.0	33.60	2.52	23.5	59.22	1.98	16.0	31.68
1947	2.22	39.5	87.69	1.06	34.0	36.04	3.39	18.0	61.02	2.29	21.0	48.09
1948	1.27	61.0	77.47	.71	45.0	31.95	2.29	24.0	54.96	2.09	22.5	47.03
1949	1.25	54.0	67.50	.64	41.5	26.56	2.19	25.5	55.85	1.82	23.0	41.86
1950	1.59	51.0	81.09	.80	41.0	32.80	2.49	24.0	59.76	2.05	19.5	39.98
1951	1.70	55.0	93.50	.82	40.0	32.80	2.77	25.5	70.64	2.18	19.0	41.42
1952	1.52	58.0	88.16	.76	37.0	28.12	2.78	24.0	66.72	2.08	23.0	47.84
1953	1.49	54.0	80.46	.71	37.0	26.27	2.79	20.5	57.20	1.91	28.0	53.48
1954	1.44	50.5	72.72	.68	41.0	27.88	2.52	21.5	54.18	2.06	30.0	61.80
1955	1.38	56.0	77.28	.57	56.0	31.92	2.29	23.0	52.67	1.91	33.0	63.03
1956	1.31	68.0	89.08	.67	47.0	31.49	2.23	28.5	63.56	1.92	37.5	72.00
1957	1.15	64.0	73.60	.61	39.0	23.79	2.13	25.5	54.32	1.96	21.0	41.16

ever, show a significant price advantage over wheat in the postwar compared to the prewar period. One bushel of wheat was worth 0.99 bushel of soybeans prewar but only 0.81 bushel postwar; during the war one bushel of wheat was worth 0.75 bushel of soybeans. Wheat

Table 4. — Wheat Price per Bushel and Revenue per Acre as Percents of Corn, Oat, and Soybean Price per Bushel and Revenue per Acre, Illinois, 1927-1957

Year	Relation of wheat price and revenue to price and revenue of: Corn		Oats		Soybeans	
	Price per bu.	Revenue per acre	Price per bu.	Revenue per acre	Price per bu.	Revenue per acre
			percent			
1927	153	65	283	150	81	84
1928	149	61	313	129	76	71
1929	147	60	287	207	70	59
1930	139	94	250	239	64	67
1931	160	102	235	163	114	149
1932	156	56	323	133	89	69
1933	170	104	266	219	120	132
1934	108	89	198	269	99	92
1935	131	49	336	171	124	97
1936	97	72	255	157	86	95
1937	219	80	368	140	129	113
1938	136	57	265	151	95	75
1939	135	54	233	155	91	76
1940	116	61	237	111	84	107
1941	136	52	246	115	66	61
1942	131	32	241	80	74	46
1943	140	46	203	101	82	65
1944	141	61	208	128	73	66
1945	129	51	233	96	75	69
1946	131	37	248	94	79	53
1947	103	55	216	133	68	79
1948	165	61	294	147	91	86
1949	146	62	284	158	83	75
1950	129	49	256	122	82	67
1951	128	44	266	126	79	59
1952	137	54	274	170	75	72
1953	128	66	269	204	68	93
1954	143	85	303	222	82	114
1955	138	82	335	197	83	120
1956	147	81	287	229	86	113
1957	170	56	321	173	92	76
Average						
1927–1957	140.58	63.81	268.81	157.71	85.84	83.87
1929–1938	146.30	76.30	278.30	184.90	99.00	94.80
1942–1947	129.17	47.00	224.83	105.33	75.17	63.00
1952–1957	143.83	70.67	298.17	199.17	81.00	98.00

prices relative to soybean prices decreased 24 percent from prewar to war and increased only 7 percent from war to postwar.

Revenue-per-acre ratios. Revenue per acre is dependent upon both price and yield. Hybrid corn was introduced in the 1930's and yields have increased rapidly since then (Table 3). From the prewar to the war period average yields of corn increased 41 percent, while oat yields increased 34 percent and soybean yields, 13 percent. Wheat yields were practically the same in both periods.

Wheat yields increased rapidly after World War II. From the war to the postwar period wheat yields increased 66 percent, almost as much as the 70-percent gain that corn yields showed from the prewar to the postwar period. Oat and soybean yields increased from war to postwar, but at a slower rate than corn and wheat.

Wheat revenue per acre averaged about three-fourths (76.30 percent) that of corn in the prewar period and slightly less than three-fourths (70.67 percent) in the postwar period (Table 4). During the war period wheat returned less than half (47 percent) as much revenue per acre as corn.

Oat prices were particularly favorable during the war period and yields increased relative to wheat. As a result, wheat revenue per acre, which had been almost double (184.90 percent) that of oats in the prewar period, fell below oat revenue in three of the six war years (Table 3). For the six-year war period, wheat averaged only a little more revenue per acre (105.33 percent) than oats. In the postwar period wheat revenue per acre was double (199.17 percent) that of oats.

Wheat revenue per acre averaged just a little less than that of soybeans in both the prewar (94.80 percent) and postwar (98 percent) periods. However, during the war period wheat averaged only 63 percent as much revenue per acre as soybeans.

These price and revenue relationships show that wheat was at a considerable disadvantage compared with corn, oats, and soybeans during the war period. There are two reasons: (1) wheat prices increased less than the other crop prices during the war period, and (2) wheat yields increased less from the prewar through the war period than those of the other grains.

In the postwar period price relationships returned to more nearly the prewar pattern and wheat yields increased rapidly. This reversal of the war-period price and yield trends resulted in wheat revenue per acre in the postwar period that was higher in relation to oats and soybeans than in the prewar period. The postwar wheat revenue per acre was almost as high in relation to corn as in the prewar period.

Relation of Wheat Production and Acreage to Price and Revenue Ratios

Wheat acreage and production clearly show an association with wheat's unfavorable revenue-per-acre relationships to other crops during the war period and with the improvement (with respect to wheat) in revenue ratios in the postwar period.

From the prewar to the war period, the revenue-per-acre ratio of wheat to corn decreased 38 percent, that of wheat to oats decreased 43 percent, and that of wheat to soybeans decreased 33 percent. In the same period, wheat production decreased 42 percent and acreage decreased 41 percent.

From the war to the postwar period the revenue-per-acre ratios increased in favor of wheat by 50 percent relative to corn, by 89 percent relative to oats, and by 56 percent relative to soybeans. Wheat production from war to postwar increased by 136 percent and acreage increased by 48 percent.

Thus the necessary conditions to establish the validity of the first hypothesis are met. The decline in war-period wheat acreage and production was associated with declining price and revenue ratios for wheat compared with competing crops. The return to approximately prewar price and revenue relationships in the postwar period was associated with greatly increased wheat acreage and production.

Illinois Wheat Production and Acreage, by Districts

Production and acreage distribution. Tables 5 and 6 show the distribution of wheat acreage and production among crop-reporting districts in Illinois (Fig. 1). Three districts appear to have long-time trends. The northwest and central districts have a downward trend in their percentage shares of total wheat acreage and production. The east southeast district has an upward trend.

During the war period (1942-1947), when total wheat acreage in the state declined from the prewar average, the west, central, east, and west southwest percentage shares of total acreage and production declined, while the east southeast, southwest, and southeast percentage shares increased. The northwest and northeast shares are negligible and showed little change.

From the war to the postwar (1952-1957) period, the west and east increased their percentage shares of total wheat acreage and production, while the southwest and southeast shares declined. The war-period decline in the central area appears to have stopped, although no

Table 5. — Wheat Acreage and Percent of Total, by Crop-Reporting Districts, Illinois, 1927-1958

Year	Northwest		Northeast		West		Central		East	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
1927	72,000	3	70,000	3	141,000	6	373,000	16	144,000	6
1928	62,000	5	42,000	3	200,000	16	199,000	16	30,000	2
1929	79,000	4	41,000	2	208,000	11	345,000	17	110,000	6
1930	73,000	4	27,000	1	214,000	11	361,000	19	92,000	5
1931	66,000	3	20,000	1	233,000	12	319,000	16	98,000	5
1932	51,000	3	14,000	1	147,000	9	217,000	14	70,000	5
1933	52,000	3	19,000	1	163,000	9	235,000	13	92,000	5
1934	39,400	2	5,000	¼	184,600	9	272,700	13	75,500	3¾
1935	38,000	2	10,000	½	208,000	10	251,000	12	56,000	3
1936	39,000	2	11,000	1	215,000	10	279,000	13	72,000	4
1937	62,400	2	24,200	1	314,600	12	335,100	13	99,000	4
1938	44,700	2	23,300	1	255,700	12	295,600	13	80,300	4
1939	37,800	2	20,200	1	206,600	11	253,400	13	78,600	4
1940	36,300	2	17,600	1	159,300	9	231,900	13	62,100	4
1941	34,900	2	16,900	1	149,100	9	231,000	14	57,900	3
1942	25,400	2	10,500	1	85,300	9	125,800	13	28,800	3
1943	18,800	2	8,200	1	75,100	7	127,000	12	21,900	2
1944	19,400	2	12,300	1	73,800	6	121,200	10	24,300	2
1945	19,500	1½	14,000	1	75,200	6	99,100	7½	24,300	2
1946	17,400	2	12,400	1	70,800	6	93,100	8	27,400	2
1947	19,800	2	17,400	1	89,100	7	112,000	8	45,200	3
1948	23,600	1	25,300	2	135,500	8	145,600	9	72,800	4
1949	24,200	1	28,200	2	193,400	10	190,400	10	103,100	5
1950	21,500	2	28,700	2	125,500	9	155,500	11	79,900	6
1951	23,500	1	32,800	2	136,500	8	178,900	10	111,800	6
1952	24,200	1	31,500	2	136,500	7	176,500	9	133,400	7
1953	22,700	1	35,800	2	172,700	8	191,000	9	161,600	8
1954	17,500	1	25,300	2	132,000	8	140,200	9	108,500	7
1955	14,000	1	23,500	2	128,400	8	124,200	8	102,200	6
1956	15,400	1	25,100	2	130,200	8	135,400	8	113,400	7
1957	16,100	1	29,100	2	147,000	8	152,800	9	131,400	7
1958	19,800	1	38,000	2	142,700	8	168,500	10	149,200	8½

(Table is concluded on next page)

Table 5. — Concluded

Year	West southwest		East southeast		Southwest		Southeast		State
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres
1927	508,000	22	262,000	12	506,000	22	217,000	10	2,293,000
1928	351,000	28	45,000	4	266,000	21	66,000	5	1,261,000
1929	530,000	27	187,000	9	376,000	19	102,000	5	1,978,000
1930	494,000	26	150,000	8	391,000	21	97,000	5	1,899,000
1931	474,000	24	213,000	11	426,000	21	145,000	7	1,994,000
1932	393,000	25	186,000	12	354,000	23	123,000	8	1,555,000
1933	437,000	24	243,000	14	415,000	23	148,000	8	1,804,000
1934	562,200	28	271,300	13	447,200	22	190,100	9	2,048,000
1935	592,000	29	233,000	11	465,000	23	195,000	9½	2,048,000
1936	594,000	29	217,000	10	465,000	23	156,000	8	2,048,000
1937	749,100	30	257,000	10	505,900	20	192,700	8	2,540,000
1938	657,800	30	193,700	9	466,800	21	166,100	8	2,184,000
1939	572,800	30	194,400	10	419,700	22	138,500	7	1,922,000
1940	520,900	30	186,900	11	395,500	23	119,500	7	1,730,000
1941	503,200	30	186,700	11	396,700	23	127,600	7	1,704,000
1942	215,100	22	92,800	10	280,700	29	106,600	11	971,000
1943	282,500	28	95,600	9	283,500	28	107,400	11	1,020,000
1944	340,500	27	119,100	10	365,200	29	164,200	13	1,240,000
1945	381,600	29	147,600	11	391,100	29	179,600	13	1,332,000
1946	294,700	25	172,400	14	363,100	30	148,700	12	1,200,000
1947	304,100	23	200,400	15	376,900	28	174,100	13	1,339,000
1948	417,300	25	276,900	16	414,500	24	189,500	11	1,701,000
1949	492,700	26	310,500	16	397,200	21	165,300	9	1,905,000
1950	360,800	25	202,800	14	314,100	22	128,200	9	1,417,000
1951	470,000	27	310,200	18	344,000	20	149,300	8	1,757,000
1952	492,900	27	365,400	20	327,100	18	157,500	9	1,845,000
1953	545,700	26	433,000	20	371,500	17	188,000	9	2,122,000
1954	390,300	24	333,900	21	297,800	19	146,500	9	1,592,000
1955	380,800	24	363,500	23	281,100	18	158,300	10	1,576,000
1956	383,200	24	366,800	23	282,600	17	170,900	10	1,623,000
1957	409,400	23	406,600	23	290,500	16	186,100	11	1,769,000
1958	374,500	22	392,600	23	269,000	16	165,700	9½	1,720,000

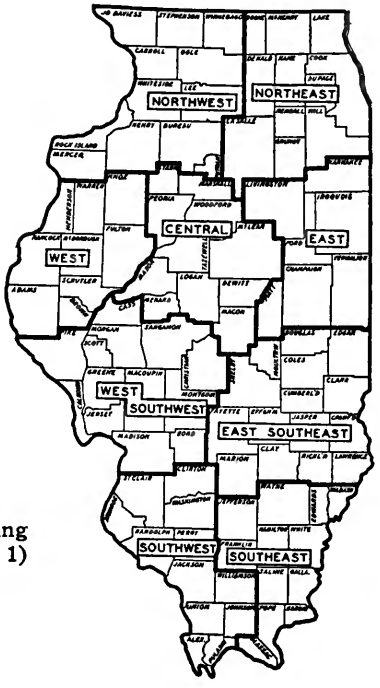
Table 6. — Wheat Production and Percent of Total, by Crop-Reporting Districts, Illinois, 1927-1958

Year	Northwest		Northeast		West		Central		East	
	Bushels	Percent	Bushels	Percent	Bushels	Percent	Bushels	Percent	Bushels	Percent
1927	2,089,500	6	3,248,500	10	1,925,900	6	5,905,000	17	3,077,600	9
1928	1,943,700	8	2,430,600	10	4,794,100	21	3,860,200	17	1,111,400	5
1929	1,917,800	6	1,779,300	6	3,084,900	10	6,250,700	20	2,864,400	9
1930	2,235,900	6	2,129,500	6	4,379,400	12	7,467,600	20	2,332,400	6
1931	1,751,600	4	1,360,400	3	4,905,800	10	7,813,000	16	2,866,300	6
1932	1,394,900	5½	1,204,600	4½	2,129,300	8	3,728,900	14	1,693,800	6½
1933	1,248,600	4	797,400	2½	3,118,300	10	4,496,000	14½	1,793,500	6
1934	571,700	1½	94,800	¼	2,713,200	7½	4,917,900	13½	1,249,300	3½
1935	771,300	2½	361,900	1¼	3,231,700	10¾	4,091,400	13½	1,019,100	3¼
1936	1,074,700	3	485,000	1¼	4,364,000	12	5,901,800	16¼	1,839,100	5
1937	1,196,600	2½	842,500	2	5,640,700	12½	5,390,500	12	1,298,300	3
1938	980,500	2½	854,100	2	5,109,100	12½	6,587,900	16	1,882,800	4½
1939	890,000	2¼	678,300	1¾	4,043,600	10	5,491,700	13¾	1,692,200	4¼
1940	1,178,400	3	765,800	2	3,760,200	9½	5,987,800	15¼	1,518,700	4
1941	778,900	2¼	592,700	1¾	2,875,200	8	4,856,400	14	1,374,100	4
1942	645,800	5	390,500	3	1,214,500	9½	1,683,800	13	500,400	4
1943	413,300	2½	284,300	1½	1,120,400	6½	2,141,600	12½	427,800	2½
1944	479,600	2	381,600	1½	1,365,900	5½	2,279,000	9½	544,900	2½
1945	545,200	2½	476,200	2	1,541,100	6¼	1,962,500	8	620,700	2½
1946	497,300	3	409,600	2	1,574,900	8	2,033,400	10½	675,000	3½
1947	586,000	2	593,700	2	2,009,700	7	2,921,600	10½	1,294,700	4½
1948	660,600	1¾	860,500	2¼	3,248,400	8½	3,908,600	10	2,027,900	5
1949	650,100	1½	801,600	2	4,724,500	10¾	5,171,400	11¾	2,976,700	6¾
1950	576,800	2	739,200	2½	3,012,900	11	4,005,200	15	1,980,300	7
1951	560,200	1½	857,400	2½	2,693,200	8	3,440,100	10½	2,463,400	7½
1952	623,000	1½	842,200	2	3,649,300	8½	4,718,700	11	3,698,500	9
1953	608,900	1	1,255,800	2	5,167,100	8½	5,951,100	10	5,301,800	9
1954	554,700	1	778,600	1½	3,714,100	8	4,098,800	8½	3,755,000	8
1955	482,500	1	845,700	1½	4,099,900	8	4,406,400	8½	3,988,500	7½
1956	505,600	1	912,800	1½	4,209,000	7	5,197,800	8½	4,525,100	7½
1957	450,500	1	785,200	2	3,966,500	11	3,817,600	10	3,283,000	9
1958	738,500	1	1,566,400	3	4,901,800	9	6,118,800	11	5,784,000	11

(Table is concluded on next page)

Table 6. — Concluded

Year	West southwest		East southeast		Southwest		Southeast		State
	Bushels	Percent	Bushels	Percent	Bushels	Percent	Bushels	Percent	Bushels
1927.....	6,703,100	20	3,915,600	11	4,893,300	14	2,332,500	7	34,091,000
1928.....	5,772,300	25	770,900	3	2,056,400	9	524,400	2	23,264,000
1929.....	7,183,000	24	2,862,600	9	3,656,600	12	1,231,700	4	30,831,000
1930.....	8,551,900	23	2,245,400	6	6,239,900	17	1,309,000	4	36,891,000
1931.....	11,460,200	23	5,207,900	11	10,176,700	20	3,403,100	7	48,945,000
1932.....	6,379,900	24½	2,770,700	11	5,116,700	20	1,564,200	6	25,983,000
1933.....	7,661,700	25	3,380,300	11	6,359,100	21	1,891,100	6	30,746,000
1934.....	11,369,300	31	4,583,400	12½	7,934,800	21¾	3,087,600	8½	36,522,000
1935.....	9,853,500	32¾	3,266,600	11	5,592,600	18½	1,871,900	6½	30,060,000
1936.....	10,398,600	28½	3,646,100	10	6,629,500	18	2,061,200	6	36,400,000
1937.....	13,623,100	30	3,393,900	7½	9,809,200	22	3,727,200	8½	44,922,000
1938.....	12,884,000	31½	3,335,600	8	7,111,400	17½	2,162,600	5½	40,908,000
1939.....	12,842,600	32	3,545,300	9	8,612,100	22	2,008,200	5	39,804,000
1940.....	12,746,500	32½	3,481,200	9	7,780,600	19¾	2,065,800	5	39,285,000
1941.....	10,568,300	31	3,356,200	10	7,262,500	21	2,655,700	8	34,320,000
1942.....	2,447,600	19	1,060,300	8½	3,456,300	27	1,418,800	11	12,818,000
1943.....	4,331,700	25½	1,424,700	8½	4,950,600	29	1,891,600	11½	16,986,000
1944.....	7,023,500	29	2,186,000	9	7,121,000	29	2,938,500	12	24,320,000
1945.....	7,439,400	29½	2,811,400	11½	6,749,000	27	2,671,500	10¾	24,817,000
1946.....	4,356,300	22½	2,908,300	15	4,956,300	25½	1,949,900	10	19,361,000
1947.....	6,688,600	23½	4,118,800	14½	7,048,700	25	3,049,200	11	28,311,000
1948.....	10,995,800	29	5,580,900	14½	8,131,500	21	3,082,800	8	38,497,000
1949.....	12,298,600	28	6,452,900	14½	8,213,200	18½	2,706,000	6¼	43,995,000
1950.....	7,960,400	28½	3,272,100	12	4,365,600	15½	1,719,500	6½	27,632,000
1951.....	10,073,400	30	5,343,600	16	5,753,600	17½	2,198,100	6½	33,383,000
1952.....	12,201,400	29	7,417,100	17½	6,477,700	15	2,807,100	6½	42,435,000
1953.....	15,482,600	26	11,838,300	20	9,582,000	16	4,228,400	7½	59,416,000
1954.....	11,805,300	25	10,005,600	21	8,536,500	18	4,511,400	9	47,760,000
1955.....	13,896,300	27	11,791,100	22½	8,405,800	16	4,091,800	8	52,008,000
1956.....	16,065,400	26½	12,784,000	21	10,705,900	17½	5,956,400	9½	60,862,000
1957.....	7,773,800	21	8,126,900	22	5,225,800	14	3,719,700	10	37,149,000
1958.....	13,231,800	24½	11,559,400	21½	6,864,200	13	3,415,100	6	54,180,000



Illinois crop-reporting districts. (Fig. 1)

increase is shown. The east southeast district continued to increase its percentage share of total acreage and production. The west southwest district does not show much change from the war period. This district averaged about 25 percent of Illinois' wheat acreage and production in both war and postwar periods.

Land productivity. Crop yields in the years 1957 and 1958 were fairly typical in Illinois. The yields of the nine crop-reporting districts for these two years give a rough index of the productivity of the land (Table 7). The five northern and central districts have the highest overall average yields and the two southern areas the lowest. The west southwest and east southeast districts are intermediate.

The northern and central districts usually have higher average yields for all four crops than the southern areas, but their advantage is relatively less for wheat and soybeans than for corn and oats. Not only do the southern areas have less fertility than the northern and central areas, but they also have less level land and more need to grow wheat in their rotations as a nurse crop for legumes. For these comparative-advantage and farm-management reasons, farmers in the

Table 7. — Crop Yields, by Districts, Illinois, 1957 and 1958

District	Corn		Oats		Wheat		Soybeans	
	1957	1958	1957	1958	1957	1958	1957	1958
	bushels per acre							
Northwest	75	74	51	59	28	37	30	28
Northeast	68	70	47	60	27	41	29	28
West	65	76	38	54	27	34	26	29
Central	72	77	32	55	25	36	30	30
East	68	70	26	54	25	39	29	28
West southwest	58	72	26	47	19	35	25	30
East southeast	49	59	24	41	20	29	22	25
Southwest	41	48	23	29	18	25	20	26
Southeast	44	47	25	24	20	21	19	25
State	64.0	69.0	39.0	55.0	21.0	31.5	25.5	28.0

southern districts tend to have less flexibility than farmers in the northern and central districts in choice of crop-rotation patterns and proportions.

Relation of production and acreage changes to productivity. The second hypothesis proposed at the beginning of the study stated that any changes in wheat production within Illinois related to changes in price-per-bushel or revenue-per-acre relationships between wheat and other grains should be greater in central Illinois, where there are more alternative uses for resources, than in southern Illinois.

The data on acreage and production changes within Illinois (Tables 5 and 6) support this hypothesis rather conclusively. Changing price and revenue relationships (analyzed on pages 7 to 11) were accompanied by considerable increases and decreases in production in the rich central part of the state — the west, central, and east districts — and by much smaller changes in the southwest and southeast districts, the poorest section of the state.

Summary

The purpose of this study was to test two economic hypotheses with respect to wheat production in Illinois: (1) wheat acreage and production decline when prices are unfavorable and increase when prices are favorable compared with competing crops, and (2) wheat-production adjustments related to price are greater in central Illinois, where there are more good alternatives, than in southern Illinois, where alternatives are more restricted.

Records on production, acreage, and price of wheat, corn, oats, and soybeans for the 32-year period 1927 through 1958 were analyzed to determine the relation of wheat production and acreage to the price-per-bushel and revenue-per-acre ratios between wheat and the three other crops. Three periods were selected for comparison: prewar (1929-1938), war (1942-1947), and postwar (1952-1957).

Production of wheat decreased 42 percent from the prewar to the war period and increased 136 percent from the war to the postwar period. In the same periods, wheat acreage decreased 41 percent and then increased 48 percent.

From the prewar to the war period, the price of wheat decreased 12 percent relative to corn, 19 percent relative to oats, and 24 percent relative to soybeans. After the war price relationships returned to more nearly the prewar pattern; from the war to the postwar period, the price of wheat increased 11 percent relative to corn, 25 percent relative to oats, and 7 percent relative to soybeans.

Revenue per acre depends on both price and yield. Wheat was at a disadvantage compared with competing crops during the war because both wheat prices and wheat yields increased less from prewar to war than those of other grains. From prewar to war, wheat revenue per acre decreased 38 percent relative to corn, 43 percent relative to oats, and 33 percent relative to soybeans. In the postwar period wheat yields increased rapidly. Coupled with the relative increase in the price of wheat, this resulted in an increase in the revenue per acre of wheat compared with competing crops; from the war to the postwar period wheat revenue per acre increased 50 percent relative to corn, 89 percent relative to oats, and 56 percent relative to soybeans.

Thus the necessary conditions to establish the validity of the first hypothesis are met. The decline in war-period wheat acreage and production was associated with declining price and revenue ratios for wheat compared with competing crops, and the return to approximately prewar price and revenue relationships in the postwar period was associated with greatly increased wheat acreage and production.

Among crop-reporting districts in Illinois, the state's decline in wheat production and acreage from the prewar to the war period was most evident in the rich central part of the state — the west, central, and east districts. In these districts, percentage shares of total wheat production and acreage decreased while in the less productive areas of the state percentage shares increased. From the war to the postwar period, when total production and acreage in the state increased, the percentage of wheat production and acreage in the three central districts either increased or remained constant; in the poorest section of

the state — the southwest and southeast districts — the percentage shares declined.

Thus the evidence supports the validity of the second hypothesis. Wheat production changes within Illinois related to changing price-per-bushel and revenue-per-acre relationships between wheat and competing grains were greater in central Illinois, where there are more alternative uses for resources, than in southern Illinois.

It is particularly interesting that in spite of the technological changes during the long period studied, the types of changes one would predict on the basis of economic theory did in fact occur. The relative changes were in the direction theory indicates they should be.

Conclusions

The Illinois experience should be roughly representative of wheat production patterns in other eastern corn-belt states and the factors influencing price and production could be expected to be the same. Table 8 gives the winter wheat acreage and production for Michigan, Indiana, Ohio, and Missouri. No detailed analysis was attempted, but inspection shows that all these states had a wartime decline from their 1930's level and that the Indiana and Missouri patterns closely follow that of Illinois (Table 1). The patterns of Michigan, which is not truly a corn-belt state, and Ohio differ somewhat from those of Indiana,

Table 8. — Winter Wheat Acreage and Production, Selected States, 1929-1938 Average and 1938-1957 Annually[a]

Year	Indiana		Michigan		Missouri		Ohio	
	1,000 acres	1,000 bu.	1,000 acres	1,000 bu.	1,000 acres	1,000 bu.	1,000 acres	1,000 bu.
1929–1938 average	1,743	30,321	834	16,742	1,865	25,561	2,004	40,211
1938	1,803	28,848	913	19,519	2,432	31,600	2,381	46,420
1939	1,534	27,612	739	15,784	1,845	30,424	1,906	37,150
1940	1,433	27,934	779	18,290	1,713	32,547	1,959	42,121
1941	1,476	34,665	741	16,286	1,336	18,036	1,959	48,978
1942	1,123	14,052	681	15,322	695	9,035	1,724	36,205
1943	955	15,274	660	11,196	973	12,649	1,603	26,449
1944	1,325	26,488	987	23,670	1,294	21,998	2,035	46,805
1945	1,555	34,980	982	27,005	1,304	18,256	2,129	57,483
1946	1,366	29,369	864	22,896	1,213	18,195	1,831	48,522
1947	1,571	36,133	1,192	29,800	1,321	24,438	2,179	49,028
1948	1,775	38,162	1,395	36,270	1,785	39,270	2,353	57,648
1949	1,740	39,150	1,297	35,019	1,946	35,028	2,353	60,002
1950	1,533	32,193	1,141	29,666	1,359	23,782	2,118	46,596
1951	1,426	23,529	1,232	30,800	1,318	22,406	1,906	34,308
1952	1,540	36,960	1,429	36,440	1,252	27,544	2,249	55,100
1953	1,648	46,144	1,515	44,692	1,578	41,028	2,384	69,136
1954	1,318	40,199	948	29,870	1,373	41,190	1,740	46,980
1955	1,186	34,394	948	27,966	1,551	48,081	1,496	43,384
1956	1,186	36,173	1,043	31,290	1,660	50,630	1,526	39,676
1957	1,281	32,666	991	28,739	1,643	37,789	1,495	32,890

[a] Source: *Agricultural Statistics*, U.S. Department of Agriculture.

Illinois, and Missouri, and a detailed analysis beyond the scope of this study would be necessary to determine the reasons.

Wheat production in the eastern corn belt appears to be closely related to changes in wheat price and revenue relationships to competing crops. Although a period in which both price and technological changes combine to reduce wheat production may not occur again, lower wheat price supports relative to those of corn, oats, and soybeans, or an increase in demand (and hence, price) for competing crops relative to wheat could be expected to reduce the incentive to produce wheat and to reduce wheat acreage and production in the region.

The results of this study indicate that lower wheat price supports and abolition of acreage controls would cause a shift of wheat production from the eastern corn belt to other regions of the country. This shift would at least partially compensate wheat producers in other regions for the loss of income due to lower wheat prices.

The land shifted from wheat in Illinois and other eastern corn-belt states would go into feed grains. However, the net addition to the feed grain supply would be something less than the total production from these shifted eastern corn-belt acres because land in other regions of the country better adapted to wheat than feed grains would be shifted from sorghum, barley, and oats to wheat.

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